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(56) Documents Cited

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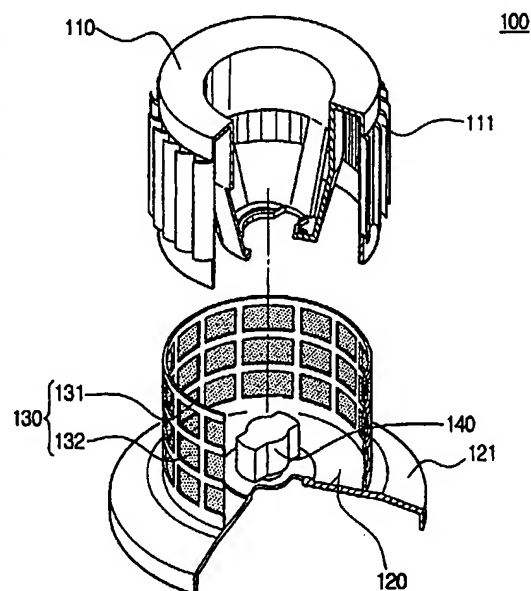
Other: ONLINE: WPI, JAPIO, EPODOC

(54) Abstract Title

Grille assembly for cyclone dust collecting apparatus

(57) The grille assembly 100 is disposed over part of an air discharge passage (22, fig 1) of a cyclone body (20, fig 1). The grille assembly 100 generally comprises a cylindrical grille body 110 having a plurality of passages 111 formed therein. A sealing member 120 is detachably secured to a lower open end of the grille body 110 by a mounting means 140. The mounting means comprises a locking knob 140 which is inserted through a hole of corresponding shape. The knob is then rotated and bears against a cam mechanism (152, fig 3) to secure the sealing member in place. The sealing member may also be a deflector plate and also the support for a secondary filter element 130. The cyclone is for use in a vacuum cleaner.

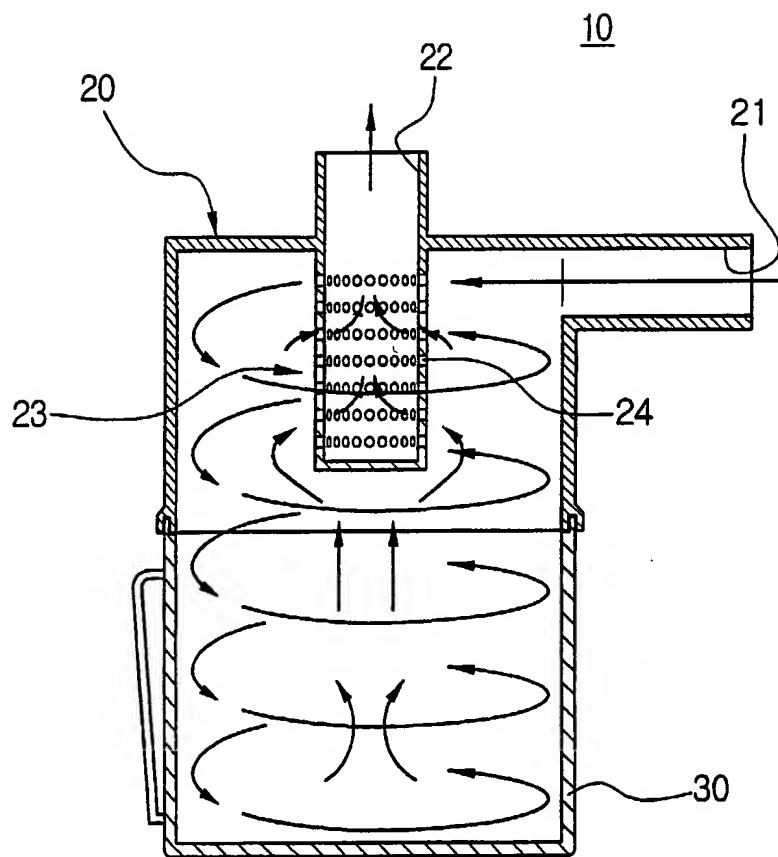
FIG.2



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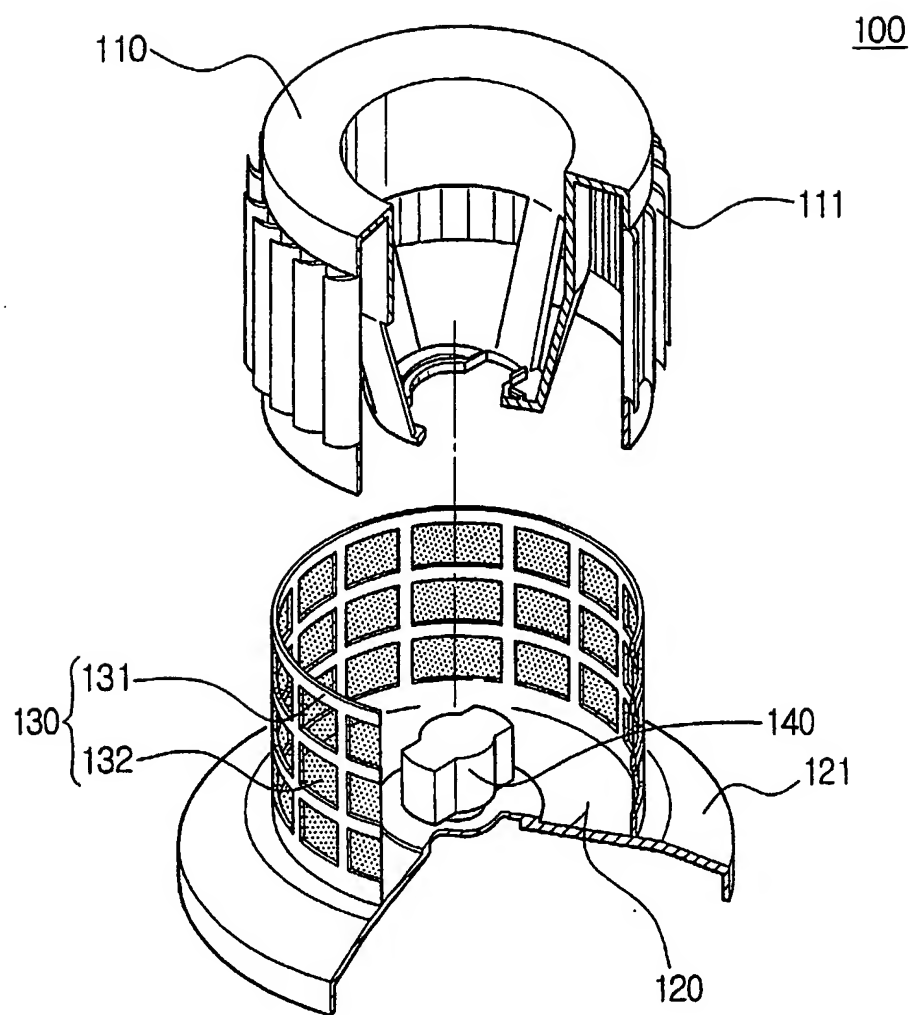
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FIG. 1



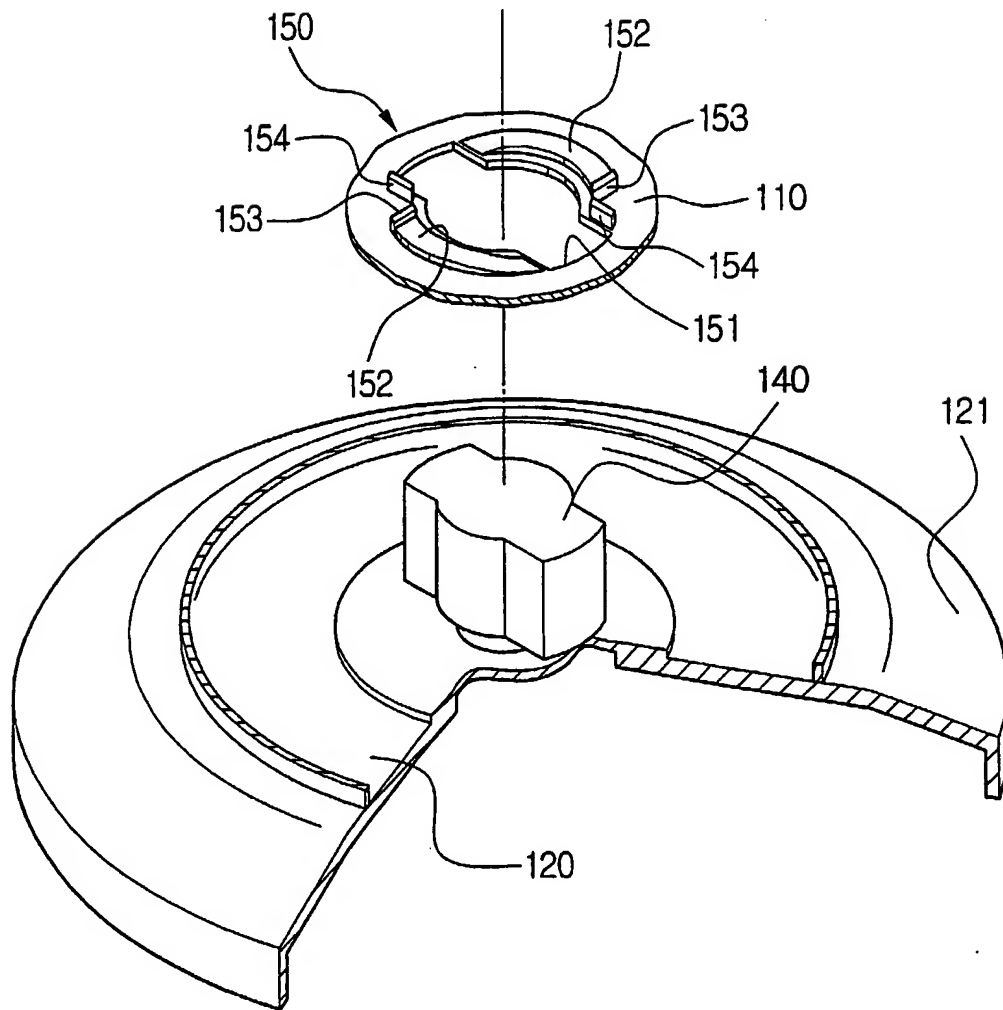
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FIG.2



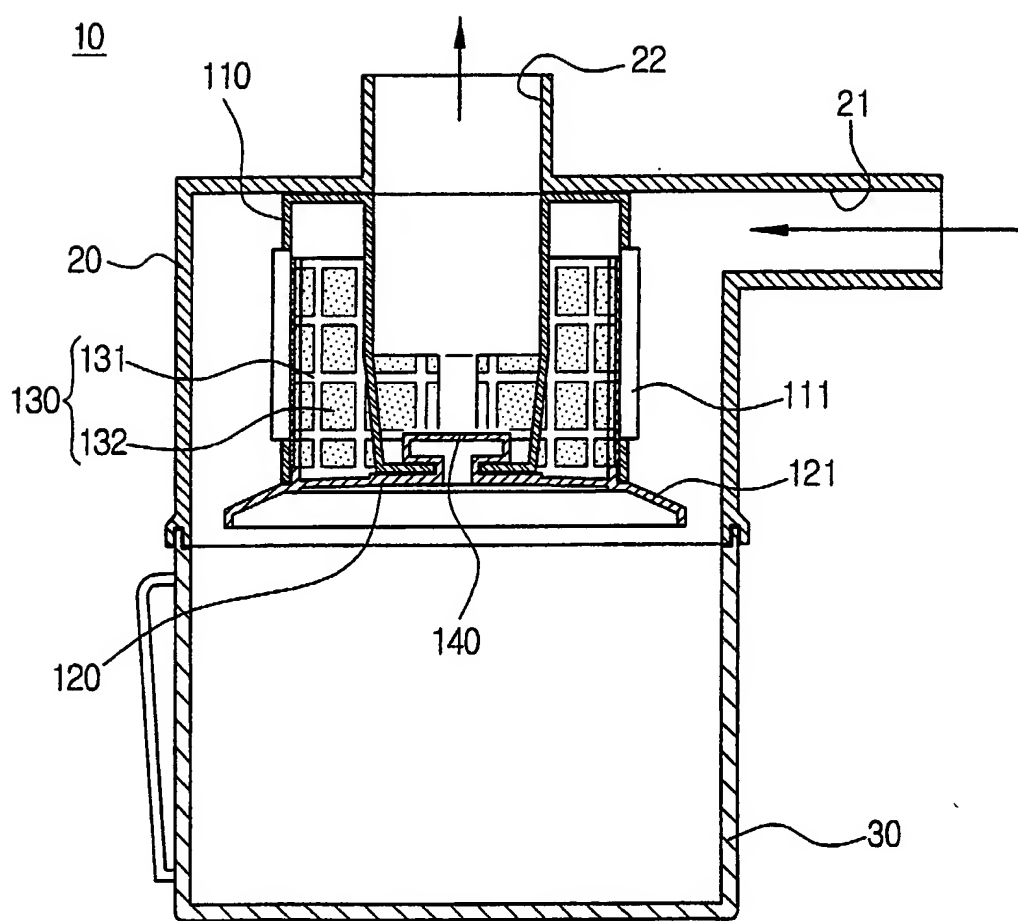
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FIG. 3



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FIG.4



**GRILLE ASSEMBLY OF CYCLONE DUST COLLECTING APPARATUS
FOR A VACUUM CLEANER**

The present invention relates to cyclone dust collecting apparatus for a vacuum cleaner,
5 and more particularly to a grille assembly of such cyclone dust collecting apparatus, the
grille being used for preventing dirt flowing into a vacuum-generating device.

Figure 1 shows conventional cyclone dust collecting apparatus for a vacuum cleaner.
Referring to Figure 1, the conventional cyclone dust collecting apparatus 10 comprises
10 a cyclone body 20 and a dust-collecting portion 30.

At an upper part of the cyclone body 20 is provided, in a side-wall, an air suction
passage 21 for connecting to a brush assembly (not shown) of the vacuum cleaner.
Owing to the orientation of the passage 21, air drawn in through the air suction passage
15 21 flows in a tangential direction into the cyclone body 20 and so forms a whirling air
current.

At an upper central part of the cyclone body 20 is provided an air discharge passage 22
for connection to a vacuum-generating device (not shown) of the vacuum cleaner.

20

To prevent dirt from flowing into the vacuum-generating device, a grille 23 is provided
at an inlet of the air discharge passage 22. The grille 23 comprises a body having a
plurality of passages 24 formed therein. When the vacuum-generating device of the
vacuum cleaner is operating, air containing many kinds of dirt or dust existing on a
25 cleaning surface is drawn into the cyclone body 20 through the brush assembly and the
air suction passage 21. The air drawn into the cyclone body 20 forms a whirling air
current, and the dust entrained in the air is separated by centrifugal force and collected
in the dust-collecting portion 30. Then, the air flows into the vacuum-generating device
through the passages 24 of the grille 23 and the air discharge passage 22.

30

However, some dirt that is not separated from the air passes through the grille 23, via
the passages 24, and flows into the vacuum-generating device through the air discharge

passage 22. This can result in a deterioration of the dust-collecting ability of the vacuum cleaner.

5 An aim of the invention is to provide a grille assembly of cyclone dust collecting apparatus for a vacuum cleaner capable of improving the dust collecting ability of the vacuum cleaner.

10 According to a first aspect of the invention, there is provided a grille assembly of cyclone dust collecting apparatus for a vacuum cleaner, the grille assembly being connectable to part of an air discharge passage of a cyclone body of the cyclone dust collecting apparatus, and arranged to hinder the flow of dust into a vacuum-generating device of the vacuum cleaner, wherein the grille assembly comprises: a generally cylindrical grille body having first and second ends, a plurality of passages being formed around the body and each end having an opening therein; a sealing member for
15 sealing one end opening of the grille body; and mounting means comprising (i) a locking knob integrally formed with an upper part of the sealing member and (ii) a hole disposed in a portion of the grille body, the locking knob being configured to pass through the hole when in a predetermined position, the mounting means being operable to enable mounting of the sealing member to the grille body.

20

According to a second aspect of the invention, there is provided a grille assembly of cyclone dust collecting apparatus for a vacuum cleaner, the grille assembly comprising: a grille member having a substantially cylindrical body with first and second open ends, the first open end being connectable to an air discharge port of a cyclone dust collecting
25 apparatus, and the second open end defining a connection interface; and a deflection member arranged to be detachably secured to the connection interface such that dust, entrained in an air current surrounding the grille member, is substantially prevented from passing through the connection interface and is deflected away from the grille member.

30

Preferably, the deflection member is detachably secured to the connection interface by means of locking knob which is arranged to rotate between first and second positions,

the locking knob and connection interface being arranged such that, when the knob is in the first position, it can pass through the connection interface, and when in the second position, it is prevented from passing through the connection interface.

- 5 The connection interface may be provided with a raised ramp portion around at least part of its perimeter such that rotation of the locking knob to the second position causes the locking knob to slide along at least part of the ramp portion thereby to attach the deflection member to the grille member. The deflection member can comprise a frusto-conical shaped flange having an overall diameter which is greater than that of the grille member. The deflection member may have a secondary filter portion formed thereon, the secondary filter portion being substantially coaxially located within the substantially cylindrical body of the grille member when the deflection member is secured to the connection interface. The second filter portion may comprise a substantially cylindrical support frame upon which is arranged a filter mesh.

15

According to a third aspect of the present invention, there is provided a grille assembly of a cyclone dust collecting apparatus for a vacuum cleaner, the grille assembly comprising:

- 20 a first grille member having a substantially cylindrical body with first and second open ends, one or more passages being formed around the body, the first open end being connectable to an air discharge port of a cyclone dust collecting apparatus, and the second open end defining a connection interface; and

- 25 a second grille member having a substantially cylindrical body with one or more passages formed therein, the second grille member being arranged to be detachably secured to the connection interface such that its substantially cylindrical body is coaxially located inside the first grille member.

An advantage offered by a preferred embodiment of the invention is that the grille assembly described may be cleaned in an easy manner since it is arranged to be simple to mount and remove.

30

There may also be provided a grille assembly of cyclone dust collecting apparatus for a vacuum cleaner which can be disposed at part of an air discharge passage of a cyclone body for separating dust from a whirling air current by a centrifugal force, the whirling air current being formed from drawn-in air, the grille assembly being arranged to prevent dirt or dust from flowing into a vacuum-generating device of the vacuum cleaner. The grille assembly can comprise a grille body having a plurality of passages formed therein and having a cylindrical shape with openings formed at both ends of the body. A sealing member can also be provided for sealing one opening of the grille body, and mounting means can be provided, the mounting means comprising (i) a locking knob integrally formed with an upper part of the sealing member and (ii) an aperture disposed at a corresponding portion of the grille body, the aperture being shaped and arranged to allow the locking knob to pass therethrough in a predetermined position, the mounting means being provided to allow easily mounting and removal of the sealing member to and from the grille body.

15

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a cross-sectional view of conventional dust collecting apparatus for a vacuum cleaner;

20

Figure 2 is an exploded perspective view of part of a grille assembly of a dust collecting apparatus for a vacuum cleaner, the grille assembly being constructed in accordance with the present invention;

25

Figure 3 is an exploded perspective view of part of a locking knob connection portion of the grille assembly of Figure 2; and

Figure 4 is a cross-section view of cyclone dust collecting apparatus including the grille assembly of Figure 2 when mounted in a cyclone body thereof.

30

Referring to Figure 2, a grille assembly 100 of the cyclone dust collecting apparatus for a vacuum cleaner comprises a grille body 110, a sealing member 120, and filtering means 130.

- 5 The grille body 110 has a generally cylindrical wall, and first and second ends having openings. The grille body 110 has a plurality of passages 111 formed in the wall. A first upper opening is connectable to an air discharge passage 22 (as shown in Figure 1) and a second, lower opening is closed by the sealing member 120.
- 10 On an outer circumference of the sealing member 120 there is provided a dust backflow preventing device 121. The backflow preventing device 121 shifts the direction of dust included or entrained in air currents flowing towards the grille body 110, outwards, towards the whirling air current in the dust collecting apparatus 10.
- 15 The filtering means 130 includes a filter support portion 131 and a filter mesh 132 which is supported by the filter support portion 131. The filter support portion 131 is integrally formed with the sealing member 120, and the filter 132 is attached to the filter support portion 131.
- 20 The sealing member 120 is provided with a locking knob 140 disposed at an upper surface part thereof. The locking knob 140 is integrally formed with the sealing member 120. As shown in Figure 3, the locking knob 140 has (i) a generally cylindrical shape extending from an upper surface of the sealing member 120 to a predetermined height, and (ii) an upper handle shaped portion.
- 25 At a lower part of the grille body 110 is provided a locking knob connection portion 150 which is arranged to correspond to the locking knob 140 of the sealing member 120. As shown in Figure 3, the locking knob connection portion 150 has an aperture 151 formed therein which is shaped so as to receive the locking knob 140 in at least one
- 30 position. A cam portion 152 is disposed around the aperture 151 in the form of a pair of ramps.

The cam portion 152 is formed such that when the locking knob 140 and the connection portion 150 are in a locking position, the locking knob 140 is 0.5mm higher than when in an unlocking position. Therefore, the sealing member 120 is firmly mounted in the grille body 110 due to movement of the locking knob 140 against the cam portion 152.

5

In other words, once the locking knob 140 is passed through the hole 151 of the grille body 110, and the locking knob 140 of the sealing member 120 is turned through 90°, the sealing member 120 is firmly mounted to the grille body 110. Thus, the sealing member 120 can be mounted on, and removed from, the grille body 110 without requiring any special tools. In addition, since the locking knob 140 and the locking knob connection portion 150 are disposed in the filtering means 130, it is unlikely that dust will flow into the connection portion and cause problems with mounting and removing the sealing member 120. In addition, cleaning, maintenance and repair of the grille assembly 100 or the filter 132 is convenient.

15

Numerals 153 and 154 shown in Figure 3 are abutment stoppers protruding from the grille body 120 to allow control of the locking and unlocking position of the locking knob 120.

20 Figure 4 is a view showing the above-described grille assembly 100 mounted in the cyclone body 20. The grille assembly 100 is removably mounted in the cyclone body 20 by a connection member such as a screw (not shown).

25 When the vacuum-generating device of the vacuum cleaner operates, a whirling air current is formed inside the cyclone body 20. Dust included in the whirling air current is separated from the air current by the centrifugal force, and the separated dust is collected in a dust-collecting portion 30.

30 Some dust, not separated from the air current by centrifugal force in the above dust collecting step, whirls around a central part of the cyclone body 20 and moves towards the grille assembly 100 due to an uprising air current.

Some dust in the air current is reflected after colliding against the dust backflow preventing unit 121 of the sealing member 120, and is shifted towards the whirling air current. Thus, the dust is again moved into the whirling air current.

- 5 Dust that has not separated from the uprising air current by the dust backflow preventing unit 121 flows into the passages 111 of the grille assembly 100. The air flows into the grille assembly 100 through the passages 111 due to a pressure difference existing between the inside and outside of the grille assembly 100.
- 10 The dust included in the air current is filtered by the filter mesh 132, and thus only 'clean' air flows to the vacuum-generating device. Therefore, a deterioration in the dust collecting ability of the vacuum cleaner is prevented, or at least reduced, since the dust is not drawn into the vacuum-generating device.
- 15 Moreover, in order to clean the grille assembly 100 and to replace the filter 132, the sealing member 120 is simply removed from the grille body 110 in a manner whereby the sealing member 120 is turned through 90° in a predetermined direction, and is then drawn out. After the cleaning and replacement steps, the sealing member 120 is
20 member 120 through the aperture 151 of the grille body 110, and then turning the knob through 90° in the opposite direction.

With the grille assembly 100 described above, it is very difficult for dust to be drawn into the vacuum-generating device of the vacuum cleaner through the air discharge
25 passage 22 of the cyclone body 20, and thus the dust collecting ability of the vacuum cleaner is improved.

In addition, it is easy to clean the grille due to the simple mounting and removal operation permitted by the sealing member 120.

CLAIMS

1. A grille assembly of cyclone dust collecting apparatus for a vacuum cleaner, the grille assembly being connectable to part of an air discharge passage of a cyclone body of the cyclone dust collecting apparatus, and arranged to hinder the flow of dust into a vacuum-generating device of the vacuum cleaner, wherein the grille assembly comprises:

a generally cylindrical grille body having first and second ends, a plurality of passages being formed around the body and each end having an opening therein;

10 a sealing member for sealing one end opening of the grille body; and

mounting means comprising (i) a locking knob integrally formed with an upper part of the sealing member and (ii) a hole disposed in a portion of the grille body, the locking knob being configured to pass through the hole when in a predetermined position, the mounting means being operable to enable mounting of the sealing member to the grille body.

15

2. An assembly according to claim 1, wherein a cam portion is provided around the hole of the grille body, the sealing member being firmly mounted to the grille body by relative movement of the locking knob against the cam portion.

20

3. An assembly according to claim 2, wherein the cam portion is formed such that a locking position is achieved by moving the locking knob against part of the cam portion which is substantially 0.5mm higher than a different part of the cam portion at which point the locking knob is in an unlocking position.

25

4. An assembly according to claim 1, further comprising filtering means disposed within an interior wall of the grille body, the filtering means being arranged to prevent dirt, which has passed through passages of the grille body, from flowing into a vacuum-generating device of the vacuum cleaner.

30

5. An assembly according to claim 4, wherein the filtering means comprises:

a filter support portion integrally formed with the sealing member; and

a filter attached to the filter support portion.

6. An assembly according to claim 4, wherein the filtering means comprises a substantially cylindrical framework upon which is mounted a mesh.
- 5 7. An assembly according to any preceding claim, wherein the locking knob of the mounting means is configured to be rotatable from the predetermined position to a further position, the hole in the grille body being arranged to retain the locking knob after it is passed through the hole in the predetermined position and rotated to the further position.
- 10 8. An assembly according to claim 7, wherein the hole in the grille is provided with a raised ramp portion around at least part of its perimeter such that rotation of the locking knob to the further position causes the locking knob to slide along at least part of the ramp portion thereby to cause attachment of the sealing member to the grille
- 15 body.
9. A grille assembly of cyclone dust collecting apparatus for a vacuum cleaner, the grille assembly comprising:
- a grille member having a substantially cylindrical body with first and second
- 20 open ends, the first open end being connectable to an air discharge port of a cyclone dust collecting apparatus, and the second open end defining a connection interface; and
- a deflection member arranged to be detachably secured to the connection interface such that dust, entrained in an air current surrounding the grille member, is substantially prevented from passing through the connection interface and is deflected
- 25 away from the grille member.
10. A vacuum cleaner having cyclonic dust-collecting apparatus which comprises a generally cylindrical cyclone body with an air inlet for dirt-laden air, a substantially axially located air exhaust opening, inside the cyclone body, a grille assembly
- 30 encircling the exhaust opening, wherein the grille assembly has a generally cylindrical outer wall with a plurality of apertures and an end wall in the form of a cover, which is secured to a central support member associated with the grille assembly, and wherein

the cover and the support member have axially located interlocking means which allow removal and replacement of the cover.

11. A vacuum cleaner according to claim 10, wherein the interlocking means
5 comprise the combination of a central boss with at least one undercurrent radial projection and an aperture shaped to allow passage of the boss in an unlocked rotational position of the cover and to prevent withdrawal of the boss when the cover is in a different, locked rotational position.
- 10 12. A vacuum cleaner having cyclonic dust-collecting apparatus which comprises a generally cylindrical cyclone body with an inlet for dirt-laden air, a substantially axially located air exhaust opening, and a grille assembly encircling the exhaust opening, wherein the grille assembly has a generally cylindrical outer wall with a plurality of apertures and a removable end wall in the form of a cover which supports a
15 filtering screen, the screen being arranged such that, when the cover is in place, the screen lies between the outer wall and the exhaust opening to filter air passing from the apertures to the exhaust opening.
13. A grille assembly, constructed and arranged substantially as herein shown and
20 described with reference to Figures 2 to 4 of the accompanying drawings.
14. A vacuum cleaner, constructed and arranged substantially as herein shown and described with reference to Figures 2 to 4 of the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0219979.2
Claims searched: 1-8, 10 & 11

Examiner: Jason Scott
Date of search: 24 February 2003

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

Category	Relevant to claims	Identity of document and passage or figure of particular relevance	
X, E	9 & 10	GB 2376197 A	SAMSUNG See whole document and in particular figures 3 & 4, & page 5, lines 4-8.
X	1, 9 & 10	GB 2344278 A	SAMSUNG See whole document and in particular figure 7 & page 21, lines 21-27.
A		US 4397071	LILLER See whole document

Categories:

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

Field of Search:

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC^v:

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The following online and other databases have been used in the preparation of this search report :

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